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IN TWO SECTIONS

Section I

IN THIS ISSUE

Make it Visual, by Frederick W. Woodbridge 315

When Is Selling at a Loss a Profitable Business Policy? by Walter B. McFarland 328

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EDITORIAL DEPARTMENT NOTE

The two contributions to N.A.C.A. literature in this issue of the *Bulletin* both come from the college campus. The first is a plea for the more common use of charts and other visual material as an aid in clarifying and emphasizing accounting procedures. The second deals with a very practical problem of accounting theory, paradoxical as this may sound. The author gives his answer to the costing problem which arises when a company possessing excess capacity considers the utilization of this capacity for the manufacture of a new product. This question has already received some consideration in the Forum section of the *Bulletin*.

The author of our first article is Frederick W. Woodbridge, Professor of Accounting at the University of Southern California, who received his Bachelor's degree at the University of Washington in 1922. His Master's degree was obtained from the same institution while he occupied the position of teaching assistant there. From 1924 to 1927, Professor Woodbridge was adjunct professor of accounting at the University of Texas, and the next year served as associate professor of accounting at Lehigh University. Since 1928 he has been connected with the University of Southern California where he is head of the accounting department. Professor Woodbridge is author of two books, *Elements of Accounting* and *System of Accounting Procedure for Live Stock Ranches*, and has contributed several magazine articles on accounting subjects. Professor Woodbridge is the present Director of Program for our Los Angeles Chapter.

Articles published in the *Bulletin* present many different viewpoints. In publishing them the Association is not sponsoring the views expressed, but is endeavoring to provide for its members material which will be helpful and stimulating. Constructive comments are welcomed and will be published in the Forum Section of the *Bulletin*.

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NOVEMBER 1, 1939

MAKE IT VISUAL

By Frederick W. Woodbridge, Professor of Accounting, University of Southern California, Los Angeles, Calif.

MANY concerns have well organized, even voluminous, manuals of office procedure. Others depend upon the familiarity of the staff with the operations of the paper work, cost and general accounting system. The value of developing definite and precise manuals of procedure has been discussed for many years. This value is twofold: first, the organized and co-ordinated consideration required to develop such outlines or manuals invariably brings to light certain weaknesses in the existing practices; and second, such manuals give the staff, even though it may be small, a guide which materially facilitates the effective operation of the system. Too often, however, even with a written manual, there are many employees who feel that it is necessary for them to learn only their own section of the work, and frequently there is little stimulus or opportunity for these people to get anything approaching a bird's-eye view of the entire system.

Engineers, salesmen, advertisers and educators have long recognized the value of using visual methods for presenting their stories. Why shouldn't accountants use the same method as an aid to developing that general comprehension which is so valuable in creating staff understanding, efficiency and esprit? There seems to be little reason why this should not be done. In fact, it has been done with excellent results. The chart on pages 326 and 327, made as the result of studies of a large number of systems, is presented as a suggestion along this line. Both the chart and the accompanying outline of procedure have been modified to avoid unnecessary detail and characteristics peculiar to particular organizations. At various points in the outline alternative methods have been indicated.

In some organizations large charts of this type have been hung in various parts of the office and plant. These have created considerable interest and comment. With such a chart each member of the staff is able to orient his work to that of the entire system and to read the office or procedure manuals with the assistance of a picture of the procedure as an aid to satisfactory comprehension.

There follows a condensed outline of a procedure manual to accompany a chart of paper work such as the one shown on pages 326 and 327.

Purchasing Raw Materials and Supplies

Request to Purchase

Indicated on chart by light broken lines.

Most of the requests to purchase will be made for raw materials and supplies. In most instances these requests will originate with the raw materials and supplies stores clerk at a time when items in stores have reached the minimum quantities established for the needed items. Each request will be made in duplicate. The original will be forwarded to the purchasing department and the carbon will be retained by the stock clerk.

Upon occasion, requests may also originate with any department head. Such requests should be approved by a responsible official before being sent to the purchasing department. (Because of the irregularity of these occasional requests no lines are shown for them.)

Purchase Order

Indicated on chart by light broken lines.

Every order for goods should be supported by a regularly numbered purchase order. This is an important instrument, for as soon as it is accepted and acknowledged by the seller it becomes a formal contract, obligating the issuing concern for the amounts listed on its face.

Four copies of the purchase order will be prepared, and used as follows:

1. To the seller.
2. To the files of the purchasing department. This copy is used for reference until the goods and the invoice are received (not shown on the chart).
3. To the controller. This copy may be used for two purposes:
   a. to keep the controller and treasurer in touch with the amount of future commitments.

b. as an audit copy against which the invoices may be verified.

4. To the receiving department. This copy will show the names of the items ordered and the unit prices, but will not show quantities or total amounts. These omissions increase the probability of a careful count by the receiving clerk.

When the goods are received and counted, the quantities received, any substitutions and any damaged items should be noted in ink or indelible pencil upon this fourth copy of the purchase order.[1] If a perpetual inventory is maintained, this fourth copy of the purchase order or the report of partial shipment will then be sent to the raw materials stock clerk,[2] who will make the necessary entry in the perpetual inventory record.

This fourth copy of the purchase order will then be returned to the purchasing department. The purchase invoice will be checked against this fourth copy for quantities and against the second copy for prices and terms. If these are in agreement, the purchasing agent will approve the invoice.

The approved invoice, with the fourth copy of the purchase order attached, will then be sent to the controller's department. After the invoice has there been matched with the third copy of the purchase order and approved by the controller, it will be passed to the bookkeeper.

The bookkeeper will debit the appropriate purchase or inventory account and credit vouchers or accounts payable. The voucher, if used, the invoice, and the third and fourth copies of the purchase order will then be placed in a vouchers payable or accounts payable file. This file is arranged according to the due dates of the various invoices.

Each day a designated clerk will take the file containing the invoices which must be paid on that day and deliver it to the cash-

[1] When partial shipments are received triplicate copies of a "Report of Partial Shipment" should be prepared. One copy will go to the controller's office and two copies to the purchasing department. One of the latter will be kept for checking purposes in the purchasing department and the other will be attached to the invoice.

[2] For the sake of segregation the raw materials and supplies stock records are placed in the office of the raw materials stock room. This, like other details, may be varied to meet the conditions existing in a particular plant.

ier. The cashier will then prepare the necessary checks and attach each check to the appropriate invoice or invoices.

The file will then be placed on the desk of the treasurer, or other officer designated to sign checks. This officer, having before him the original purchase order, the evidence of goods received, and the invoice bearing the approval of the purchasing agent and controller, will sign each check with the assurance that the disbursement is in order.

When the checks have been signed, the file will be returned to the cashier, who will make the appropriate entry in the cash disbursement journal, stamp the invoices "paid," make on each a notation of the check number, and place the checks in the mail.

The invoice file will then be returned to the bookkeeper, who will make the appropriate entry in the voucher register or in the accounts payable accounts. After these entries are made, the invoices, with their supporting data, may be filed.

When the checks are returned to the controller's office with the monthly bank statement the paper work of purchasing is complete.

Operating Expense Items

Indicated on the chart by a light solid line.

Many items of expense are acquired on purchase orders in the same manner as are items of stock-in-trade. These will be handled in the same general manner as purchases of raw materials and supplies.[3]

There are, however, other expense items for which no purchase order will be issued. These may be broken into three groups, as follows:

1. Constantly recurring expenses such as freight, light, gas, watchmen's services, window cleaning, etc. The invoices for these expenses will be approved by some designated person, probably the superintendent, and will then be forwarded to the controller's department. From this point on they will be handled in the same manner as the purchase of raw materials and supplies.

[3] There would be no change in the path of the papers. Appropriate expense accounts would be charged instead of raw materials.

2. Irregular expenses such as especially required supplies, repairs, etc., which it is impracticable to handle through the regular purchase order procedure. (Such items should be reduced to a minimum.) The invoices covering such expense items should be approved by the superintendent, a department head, or the general manager before being forwarded to the controller's office. From this point on they will be handled in the same manner as the purchase of raw materials and supplies.

3. Regular and irregular expense for which no invoices are received, such as wages and goods taken from stock for use in the business.

   When goods are withdrawn from stock for use in the business an expense requisition should be prepared and signed by the superintendent or other designated person, showing the goods withdrawn and for what purpose they are to be used. After the goods have been withdrawn from stock the requisition will be sent to the raw materials stock clerk, who will place the cost of the items on the memorandum and make the necessary entries in the stock ledger. The raw materials stock clerk will then forward the memorandum to the controller's office. The bookkeeper will transfer this cost from the inventory account to the appropriate expense account.

The payroll for the manufacturing departments will be discussed later. The payroll for the office departments, which are frequently on a monthly basis, will be prepared in the controller's office and approved by the office manager and the controller. This payroll will then be given to the cashier, who will, first, draw a check for the total amount from the general cash and place that amount in the special payroll account, and second, draw the individual payroll checks against this special payroll account, charging accrued payroll. The office payroll will then be forwarded to the bookkeeper, where it will be the source data for the bookkeeper's entries to the various expense accounts affected and a credit to accrued payroll.

MANUFACTURING

Notice of Depleted Stock

Indicated on the chart by a heavy solid line.

It is assumed in this case that the concern fills its sales orders from stock. When the stock of a particular item reaches the minimum quantity, the finished goods stock clerk will prepare in duplicate a "Notice of Depleted Stock." The original will be sent to the superintendent and the carbon retained by the finished goods stock clerk.

Production Order (at time issued)

Indicated on the chart by a heavy solid line.

The production order, of which five copies are made, originates in the superintendent's office. One of these copies will be retained as a "file" copy in the superintendent's office and the others will be forwarded to the planning department.

After determining that the necessary raw materials and supplies are available,[4] the planning department will retain one copy, which will serve as a schedule sheet, and forward the others to:

1. Cost Department. This copy is so designed that it may receive the posting of cost items, and therefore becomes an account in the goods-in-process subsidiary ledger.
2. At the time production is started this copy of the production order will be sent to finished goods storage as an "advice of goods in process."
3. Factory Foreman. This copy, frequently made on tagboard, will have listed upon it all manufacturing operations, and may be accompanied by the detailed instructions for the job. This copy will accompany the work as it progresses through the plant. When the job is completed and all of the operations listed on this copy have been checked, the finished product and this copy of the order will be forwarded to finished goods storage.

[4] A separate form or one copy of the purchase order may be designed so the required materials may be listed. This form may then be sent to the raw materials stock clerk, who will indicate what materials are on hand and return the form to the planning department. In many medium-sized and smaller plants this information is obtained informally; therefore no line has been provided on the chart for the obtaining of this information.

Material and Supply Requisitions

Indicated on the chart by a light solid line.

Requisitions will originate in the planning department. These requisitions will be made in duplicate, the duplicate copy being retained in the planning department. The original will be sent to raw materials storage.

After the requisition is filled, this copy will be delivered to the raw materials stock clerk, who will price the items shown on the requisition and make the required entry in the stock ledger to record the issue of raw materials. This copy of the requisition will then be sent to the cost department.

The cost department will make the appropriate cost entry, after which the requisition will be filed in a summary file so that the amounts of raw materials and supplies used may be summarized for the daily or monthly report to the general bookkeeper.

Summary of Raw Materials and Supplies Used

Indicated on the chart by a light solid line.

At appropriate times the cost accountant will make up a report of all raw materials and all supplies which have been issued by the store room. This report may be in the form of a complete list of all requisitions, classified according to the amounts of direct and indirect materials charged to production orders and to the standing orders for service departments. (Frequently it is possible to so classify the requisitions that totals may be run and this report made in the form of a journal voucher.) However made, the report is the source data which enables the general bookkeeper to credit the inventory and charge work in process or the appropriate operating accounts.

Time Cards

Indicated on the chart by a light solid line.

Time cards are made for each manufacturing department employee. It is assumed here that "in" and "out" cards are used for all direct labor and that all indirect labor uses similar cards, checking in and out on standing orders. The timekeeper will accumulate these cards each day and record the time worked on the time book or on time sheets.

The cards will then be forwarded to the cost department, where the time will be posted to the appropriate production and standing orders.

Payroll

Indicated on the chart by a light solid line.

At the close of the factory payroll period the timekeeper will prepare the payroll. The payroll will then be forwarded to the cashier. When the cashier receives the payroll he will at once draw a check for the total amount.

(a) If the employees are paid by payroll checks, this total amount will be deposited in the payroll account and special payroll checks will be drawn against it, with a charge to accrued payroll.

(b) If the factory workers are paid in cash, the cashier or paymaster will determine the necessary amount of each denomination of coin and currency, and withdraw the funds from the bank on the check drawn for the total payroll amount, which in this case will be charged directly to the accrued payroll account. The coin and currency will then be distributed to the proper pay envelopes.

After the employees have been paid the payroll will be forwarded to the controller's office. These payroll figures will then be used as source data for the credit to accrued payroll and the debit to goods in process and the appropriate operating accounts.

Report on Men Hired, Fired, and on Pay Rate Changes

Indicated on the chart by a light solid line.

At the close of each payroll period the employment department will forward to the controller a report showing the names, place of employment and rate of pay of all men who have been added to the force, who have had changes in their rates of pay, or those who have been released. As all such changes should pass through the employment department, this report is used in the confirmation of payroll changes by the auditor of the payroll.

Report on Applied Burden

Indicated on the chart by a light solid line.

Just prior to the beginning of the cost period the expense budget will be prepared for the coming period. On the basis of this information and the forecast of production volume, the burden rates for the period will be determined. Burden will then be applied to the various production orders at these rates. At weekly or monthly intervals the cost department will report the total amount of burden that has been applied to the various production orders. This may be accomplished by a separate report or by journal voucher. However transmitted, this report is the source data for the general bookkeeper's charge to goods in process and credit to the applied burden account.

Production Order (at time orders are completed)

Indicated on the chart by a heavy solid line.

When the work on an order is completed the planning department will notify the cost department, which will check to see that all charges have been made, close the order, and determine the unit cost if that is necessary. This copy of the production order (which becomes the report of a completed job) will then be forwarded to finished goods storage.

The finished goods storage clerk will then match this report with the copy which came through the manufacturing departments, make the necessary entry on the finished goods stock record, and forward the cost copy to the controller's office.

In the controller's office this copy will provide the source data for the general bookkeeper's charge to finished goods and credit to goods in process.

Selling Stock-in-Trade

Indicated on the chart by light broken and dotted lines.

The paper work of selling stock-in-trade starts with the sales order, which may originate with the customer or with the salesman who sends it to the sales office. Assuming that this is not a cash transaction, the sales order will be sent immediately to the credit department.

The credit department will determine whether or not credit shall be extended to the person ordering the goods. If the purchaser's credit is considered satisfactory, credit department approval will be placed on the order, which will then be forwarded to the shipping department.

The shipping department will obtain the merchandise from storage, pack it and ship it to the customer. The sales order will then be sent to the finished goods stock clerk, who will enter the cost prices on it, make the necessary entry in the stock record, and forward the order to the controller's department.

From the information given on the sales order, an invoice (showing the sales order number) will be prepared in duplicate. The original will be mailed to the customer. The duplicate invoice will then be used as the source data for the bookkeeper's charge to the customer.

The sales order will be filed according to finished stock classifications (if such are maintained). The carbon copy of the invoice will be bound according to sales classification. At convenient intervals the figures on the bound copies of the invoices will be summarized to obtain the credits for the sales accounts and the figures on the sales orders will be summarized to obtain the figures for the debits to the cost-of-goods-sold accounts and the credit to finished goods.[5] The sales orders may then be filed in an alphabetical customers' file.

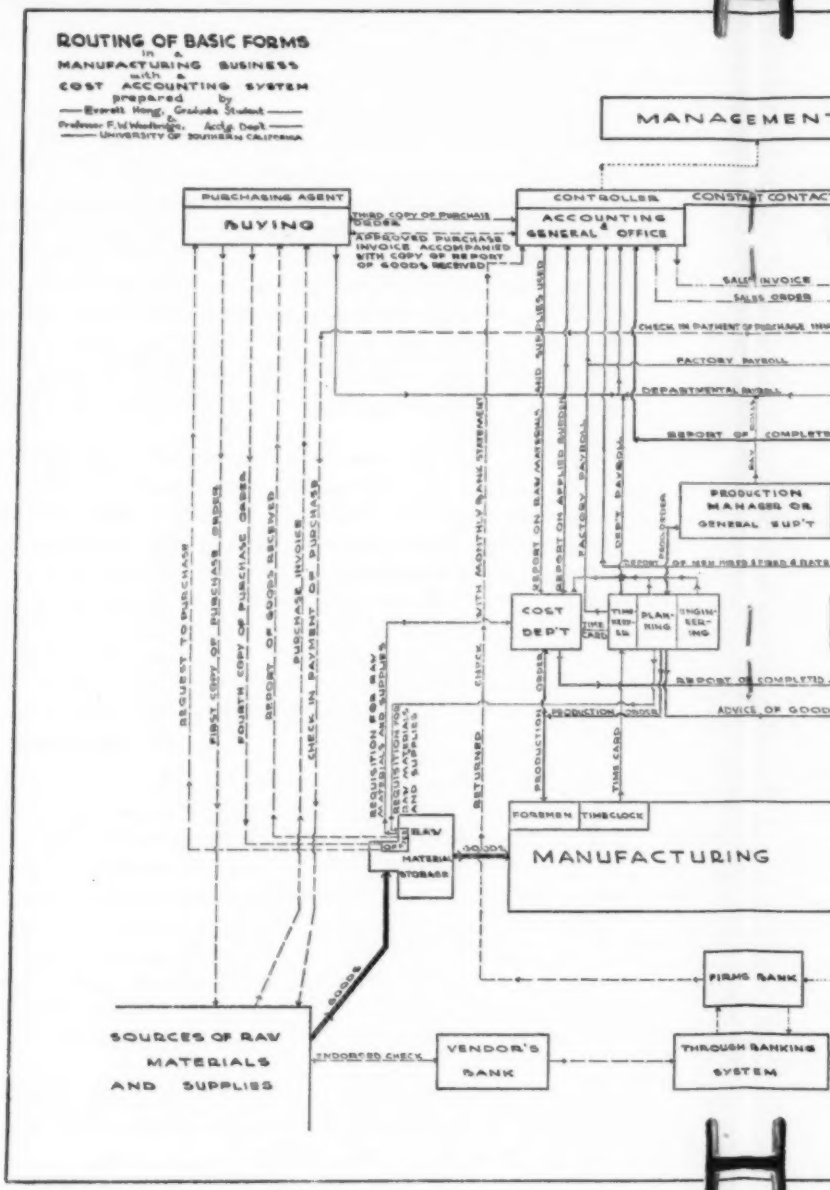
At the time of payment a check from the customer will be received by the cashier's department. The amount will be recorded in the cash receipts journal, which will be used as the posting medium to the customer's account. When the cashier makes up the deposit, duplicate deposit slips will be prepared. Each check should be listed on the deposit slips in the exact order in which it appears on the cash receipts journal so as to facilitate the audit against "kiting." When the deposit has been made, the person making the deposit will return the pass book to the cashier. The duplicate deposit slip should, however, be placed in the controller's office.

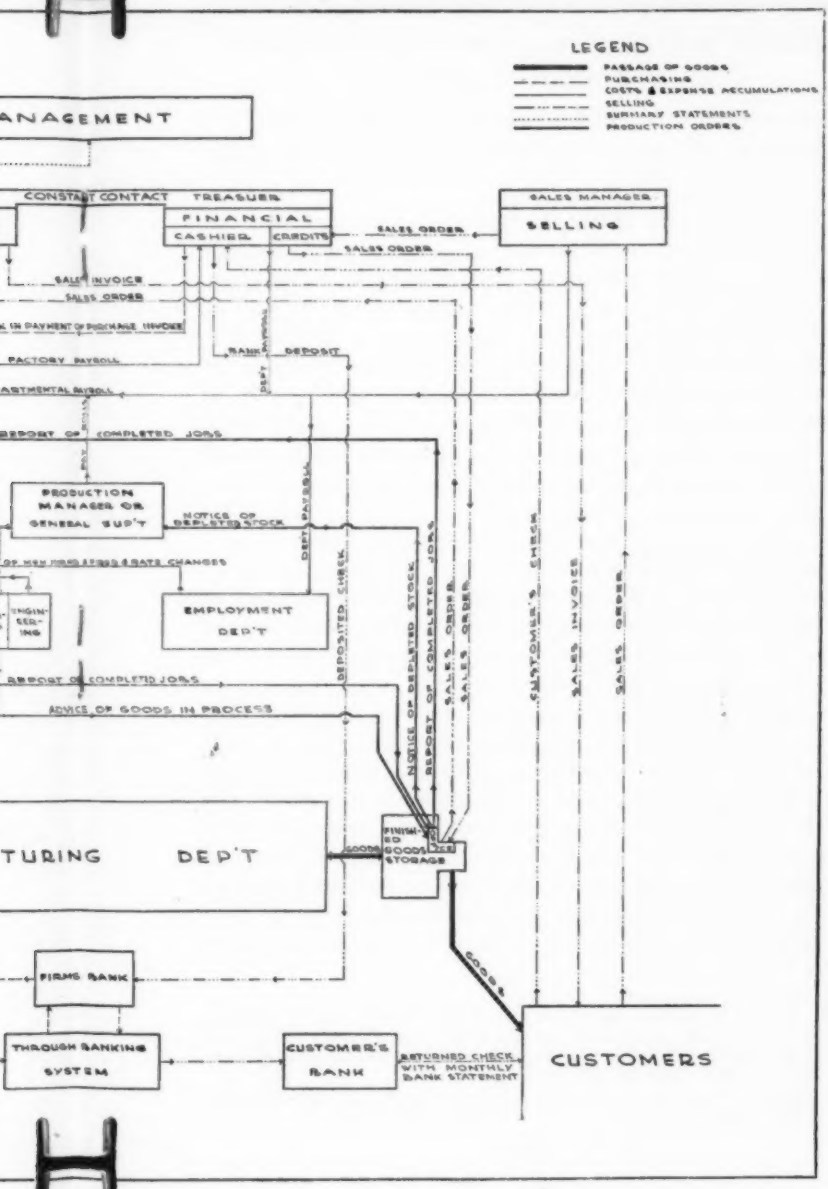
[5] Frequently adopted is a procedure of internal check on the invoicing and accounts receivable control. This is accomplished by having the sales figures as well as the cost figures accumulated from the sales orders.

Use of Charts

As previously stated, much detail has been omitted from this skeleton outline of a system manual and at some points alternative methods have been indicated. The parts omitted have been largely those that would vary with each different establishment and would not have contributed to a clearer understanding of the use of charts. Overall charts, such as the one illustrated, may frequently be supplemented by charts which will illustrate the intra-departmental steps of the papers and accounting procedures. Such charts may illustrate many intradepartmental activities which, for the sake of clarity, must be omitted from the more general picture. For instance, such a subsidiary chart might advantageously be prepared for the cost department or for the controller and treasurer's offices (combined).

All visual aids stimulate staff comprehension and interest and thereby assist in avoiding many of those "bonehead" errors which are so annoying. They also assist in making it less difficult for those who, as a result of storm, illness of staff members, etc., are suddenly shifted to new duties.


ROUTING OF BASIC FORMS
in a
MANUFACTURING BUSINESS
with a
COST ACCOUNTING SYSTEM
prepared by
—Everett Hong, Graduate Student—
&
Professor F. Id Westbrook, Acctg. Dept.
—UNIVERSITY OF SOUTHERN CALIFORNIA
MANAGEMENT
PURCHASING AGENT
BUYING
CONTROLLER
ACCOUNTING & GENERAL OFFICE
THIRD COPY OF PURCHASE ORDER
APPROVED PURCHASE INVOICE ACCOMPANIED WITH COPY OF REPORT OF GOODS RECEIVED
SALES INVOICE
SALES ORDER
CHECK IN PAYMENT OF PURCHASE INV
FACTORY PAYROLL
DEPARTMENTAL PAYROLL
REPORT OF COMPLETE
PRODUCTION MANAGER OR GENERAL SUP'T
REPORT OF NEW HIRES & TIME & RATE
REQUEST TO PURCHASE
FIRST COPY OF PURCHASE ORDER
FOURTH COPY OF PURCHASE ORDER
REPORT OF GOODS RECEIVED
PURCHASE INVOICES
CHECK IN PAYMENT OF PURCHASE
REPORT ON RAW MATERIALS AND SUPPLIES USED
REPORT ON APPLIED BURDEN
FACTORY PAYROLL
DEPT PAYROLL
WITH MONTHLY BANK STATEMENT
COST DEP'T
TIME CARDS
TIME KEEPING
PLANNING
ENGINEERING
REPORT OF COMPLETED
ADVICE OF GOOD
REQUISITION FOR RAW MATERIALS AND SUPPLIES
RETURNED
PRODUCTION ORDER
TIME CARD
FOREMEN
TIMECLOCK
RAW MATERIAL STORAGE
GOODS
MANUFACTURING
FIRING BANK
SOURCES OF RAW MATERIALS AND SUPPLIES
ENDORSED CHECK
VENDOR'S BANK
THROUGH BANKING SYSTEM


LEGEND
PASSAGE OF GOODS
PURCHASING
COSTS & EXPENSE ACCUMULATIONS
SELLING
SUMMARY STATEMENTS
PRODUCTION ORDERS
ANAGEMENT
CONSTANT CONTACT
TREASURER
FINANCIAL
CASHIER
CREDITS
SALES MANAGER
SELLING
SALES ORDER
SALES ORDER
SALES INVOICE
SALES ORDER
BANK DEPOSIT
PAYROLL
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FACTORY PAYROLL
REPORT OF COMPLETED JOBS
PRODUCTION MANAGER OR GENERAL SUP'T
NOTICE OF DEPLETED STOCK
DEPT PAYROLL
EMPLOYMENT DEP'T
DEPOSITED CHECK
REPORT OF COMPLETED JOBS
ADVICE OF GOODS IN PROCESS
NOTICE OF DEPLETED STOCK
REPORT OF COMPLETED JOBS
SALES ORDER
SALES ORDER
CUSTOMER'S CHECK
SALES INVOICE
SALES ORDER
TURING DEP'T
FINISHED GOODS STORAGE
GOODS
COSTS
FIRMS BANK
THROUGH BANKING SYSTEM
CUSTOMER'S BANK
RETURNED CHECK WITH MONTHLY BANK STATEMENT
CUSTOMERS

WHEN IS SELLING AT A LOSS A PROFITABLE BUSINESS POLICY?

By Walter B. McFarland, Instructor in Economics, Sheffield Scientific School, Yale University, New Haven, Conn.

IN RECENT issues of the *N. A. C. A. Bulletin* there has appeared considerable discussion of the costing problem which arises when a manufacturing company, possessing vacant space in its factory, considers the utilization of this capacity by making an additional product. The issue was raised by a question submitted to the Research and Service Department of the National Association of Cost Accountants and published together with the answers given by eight different accountants.[1]

In the case presented, the management of the company contended that the cost of the additional product should be computed by adding to the purchase price of the raw material, all additional out-of-pocket expenses plus depreciation on new machinery purchased to process the added product. Those costs, which would go on without change in their total amount regardless of whether or not the additional product was manufactured, should, it was argued, be included in the cost of the regular products and not allocated to the additional product.[2] In other words, the position taken was that by spending a certain number of dollars on additional raw material, labor and depreciation, the company could obtain a larger number of dollars, and that the difference between such added expense and added revenue would be a profit. On the other hand, a majority of the accountants who commented upon the question maintained that the cost of the new product should be computed by allocating to it overhead costs on the same basis used for the rest of the company's products, thereby charging to the new product a pro-rata share of the fixed costs incurred previous to the addition.

[1] See *N.A.C.A. Bulletin* for May 1, 1937, pp. 397-98; June 1, 1937, pp. 1121-28; July 1, 1937, pp. 1230-31; August 1, 1937, pp. 1347-48; and October 1, 1937, pp. 179-80. The same question appeared in the *Journal of Accountancy* for February, 1938, pp. 155-56.

[2] Examples of such costs would be the depreciation, taxes, and insurance on existent buildings.

A Problem of Applying Fixed Costs

This same problem arises in a variety of forms and on many occasions. The essence of the situation is that there exist certain fixed costs which do not increase when output from the factory is somewhat increased, and also certain non-proportionately variable costs which rise more slowly than output. The presence of such costs is almost universal, for virtually every company has some space, equipment or employees whose services are not as fully utilized as they might be.[3] Thus there often exists the possibility that these unused facilities can be put to work by developing a side line or by increasing output of the present product and finding a new market for it. Since the accountant will be called upon to supply the costs that such changes in policy involve, he should accordingly be thoroughly familiar with the principles and techniques required for finding the answers to problems of this type.

Illustrative Case

The procedure most commonly followed by the accountant will first be presented in the following illustration. The figures are, of course, hypothetical, but not unlike those which might be found in many real situations.

The company here under consideration manufactures a single product which will, for convenience, be called Product A. The company's periodic statement of profit and loss on manufacturing operations follows on page 330.

It will be noted that the company is now operating at only 90 per cent of nomal capacity and that unabsorbed overhead amounting to $10,000 has been carried to profit and loss. The company is anxious to improve the utilization of its plant in order that this loss may be eliminated, but a study of the market indicates that it is impossible to expand sales of Product A at any time in the near future. However, there does exist a potential market for Product B, a similar article which can be made in the same plant with the

[3] This may be true even though the books show that 100 per cent of the overhead is being absorbed at the time, for most normal overhead rates allow for lack of balance in facilities and many also consider the ability of the market to absorb the product.

	Per Unit		*Total*	
Sales, 90,000 units of Product A		$2.50		$225,000
Cost of production:				
Direct material	$0.50		$45,000	
Direct labor	0.25		22,500	
Overhead*	1.00		90,000	
Total manufacturing cost		1.75		157,500
Operating profit		$0.75		$ 67,500
Unabsorbed overhead				10,000
Net profit				$ 57,500

addition of some new equipment. Engineering estimates show that this equipment will increase overhead charges by approximately $10,000 a year. At the same time the sales department reports that it can reasonably expect to sell 40,000 units of Product B without cutting the established market price of $1.50 per unit. The cost accountant is next instructed to compute the cost of the proposed new product in order that management may know whether or not its sale will be profitable.

Usual Cost Computation

If this company's cost accountant follows the method which is not infrequently used by accountants under such circumstances, the annual profit and loss report on Product B would appear as indicated at the top of the following page.

If the calculations are carried no further, the company will most certainly not undertake manufacturing of the new product. However, the alert accountant will readily see that recognition must be

* Applied at a normal rate of $2 per direct labor hour. This rate is based upon a normal capacity of 50,000 direct labor hours and normal total overhead cost of $100,000 per period.

	Per Unit		*Total*	
Sales, 40,000 units of Product B		$1.50		$ 60,000
Cost of production:				
Direct material	$0.35		$14,000	
Direct labor	0.25		10,000	
Overhead*	1.00		40,000	
Total manufacturing cost		1.60		64,000
Indicated loss on Product B		$0.10		$ 4,000

given to the fact that some of the previously existing overhead will be absorbed by the new product and that this gain may offset the above loss.

When the calculations are carried further to show what effect the new product will have on total overhead costs, these results are obtained:

Total overhead when Product A is produced by itself		$100,000
Additional overhead incurred when Product B is added		10,000
Total overhead to produce both products together		$110,000
Total overhead absorbed by Product A	$90,000	
Total overhead absorbed by Product B	40,000	
Total overhead charged to cost		130,000
Overabsorbed overhead		$ 20,000

Thus there appears an overabsorbed overhead balance of $20,000 which offsets the previously indicated loss of $4,000 on Product B and leaves a net gain of $16,000 as the final result of adding Product B to the product already being made.

* Applied at a normal rate of $2 per direct labor hour.

Nature of Overabsorbed Balance

While overabsorbed expense balances are often treated as reserves and carried in the balance sheet until needed to cancel underabsorbed balances, it seems justifiable to regard the above $16,000 balance as a proper addition to net profit after the goods have been sold. It is true that overabsorbed overhead balances which result from seasonal or cyclical fluctuations in volume of output are recurring in nature and credit balances in the overhead expense account are usually offset by debit balances arising at some later time. However, the addition of a new product may well cause the overhead to be continuously overabsorbed. A reserve with a steadily increasing balance would have no purpose and hence, after a reasonably large reserve has been accumulated, any further overabsorbed overhead balances are best regarded as profits. But regardless of how the overabsorbed balance is disposed of, the change of a $10,000 underabsorbed burden balance into a $16,000 overabsorbed balance certainly points strongly in favor of the additional product, although cost is not the only matter to be considered in the decision.

The above illustration has been worked out at considerable length to present the usual accounting method for making such calculations. While it is quite capable of producing the true facts of the situation, it involves a contradictory appearance in that goods seemingly can be sold at a unit loss to increase the total net profit. Thus, in one of the answers to the question previously referred to, it was admitted that management might sell the new product at any price which exceeded the out-of-pocket cost, although such a procedure is ". . . not to be construed as selling at a profit, but is selling at a loss."[4] Executives not versed in the techniques of accounting are certainly justified in regarding such statements as paradoxical.

Analysis of Overhead Charged to Product B

These apparently contradictory results come from costing the new product at an overhead rate which was designed for use when 100,000 units of Product A were considered to be a normal output. In the calculations given on page 331, Product B has been charged

[4] Answer No. 2, *Journal of Accountancy*, February, 1938, p. 156.

with the same rate that is already in use for Product A, on the theory that Product B will use the same amount of direct labor per unit. This seems to be in accord with prevailing cost practice as expressed in the various answers, for these stressed the point that the cost of the new product should be computed by allocating to it overhead costs on the same basis used for the rest of the company's products, thereby charging to the added product a pro-rata share of the fixed costs incurred previous to the addition of Product B.[5]

This means that, in the illustrative case set out above, Product B has been charged with (1) the added overhead occasioned by introduction of Product B ($10,000), the underabsorbed burden loss previously being incurred ($10,000), and the overabsorbed burden ($20,000). When these items, aggregating $40,000, are all assigned to Product B and averaged over the number of units produced,[6] the unit cost obtained exceeds the unit price for which the product can be sold. However, since it has already been shown that introduction of Product B will change the present unabsorbed burden loss to a rather sizable gain, this indicated unit loss is clearly erroneous. A cost figure containing such an average share of all fixed cost is not the real cost of the additional product. In order to obtain a correct unit cost it would be necessary to apportion the overabsorbed balance to Product B. Inasmuch as the accountant ordinarily carries these balances direct to profit and loss or to a reserve account instead of distributing them to product, unit costs are apt to be an unsatisfactory basis for policy decisions of the type here under consideration.

A Simpler and More Direct Method

There is, however, a simpler and more direct way to calculate the cost of Product B. It proceeds by charging to Product B only those costs which will be added by the decision to make this product. The calculations are then:

[5] Thus Answer No. 1 (*Journal of Accountancy*, February, 1938, p. 156) states: ". . . this new product should be subject to the same methods of cost accounting as apply to other products. . . . Any other method would result in a distortion of costs."

[6] Production is, of course, here measured in direct labor hours and the total overhead is distributed by averaging it over the total number of direct labor hours used.

	Per Unit		*Total*	
Sales, 40,000 units of Product B		$1.50		$ 60,000
Cost of production:				
Direct material	$0.35		$14,000	
Direct labor	0.25		10,000	
Additional overhead*	0.25		10,000	
Total manufacturing cost		0.85		34,000
Operating profit on Product B		$1.10		$ 26,000
Less cost of capacity formerly unused				10,000
Increase in net profit ascribable to Product B				$ 16,000

When this method is used there is no contradiction in results, for it shows exactly how much the total profit of the company will increase if 40,000 units of Product B are produced in addition to 90,000 units of Product A. Furthermore, it yields a unit cost which can be multiplied by the number of units produced to yield the additional profit contributed by Product B. Moreover, it will be noted that while the results do not differ from those on page 331, they are obtained more directly and more simply than where the established burden rate is applied. Here Product B has been charged with only its differential cost.[7] In one sense, this is the only cost for which Product B is responsible because the other costs were initially incurred for Product A and cannot now be

* Applied at a normal rate of $0.50 per direct labor hour. This rate is obtained by dividing the normal labor requirement of Product B (20,000 direct labor hours) into the additional overhead cost traceable to B ($10,000).

[7] Differential cost may be defined as the sum of the costs which will be added by producing Product B in addition to Product A or, conversely, the sum of the costs which could be avoided by producing Product A by itself.

saved by deciding not to produce B. This differential unit cost[8] can be compared directly with the unit price to be realized from sale of Product B without involving contradictory results, for this comparison then tells exactly how much each unit sold will add to the firm's net profit. This would seem to be a distinct advantage, for executives are accustomed to make decisions by comparing unit costs with unit selling price and hence it is important that the unit costs shall not be misleading.

New Problems Arise When Facilities Need Replacement

When the plant facilities now devoted to manufacturing Product B wear out, management must then decide whether or not to replace these facilities. Again the decision should be made by comparing the sales revenues from Product B with the additional costs that must be incurred to continue production. These costs will be higher than when the initial decision to start making Product B is made, for it will then be necessary to replace assets which are already possessed and in serviceable condition at the present time. Hence it is quite possible that a better return can be had in the future by discontinuing production of Product B and using the capital for another purpose. In other words, the company then will have a wider range of choice in deciding what to do with its capital, for liquid funds which can be turned to virtually any use will be dealt with, whereas now the capital is in the form of buildings and machines that can be used only to make the kind of goods for whose production they have been designed.

However, the above statements do not imply that the customary method for setting and applying an overhead rate to Product A is in any way objectionable. Instead the only contention is that this same rate, when applied uncritically to the distinctly different problem of costing an additional product, can lead to a faulty managerial decision.

Objections Raised

In the comments appearing in the Forum Section of the *Bulletin* two principal objections were urged against the latter method of costing Product B. These were:

[8] Strictly speaking, this figure is the average cost of the additional output.

(1). That it is likely to lead to price cutting of a sort which demoralizes the market and makes business unprofitable for all concerned.

(2). That the new products may be easy to sell and hence the sales department will concentrate its efforts on them and neglect the products which carry the major portion of the overhead.

Both of these arguments are sufficiently serious to merit some discussion.

Price Cutting

With reference to the inducement of price cutting, it should first be pointed out that the problem under consideration may well be and often is whether or not to make and sell a standard product at its established price. The question may concern the addition of a related product to the present line, or it may merely be a question of whether or not to expand the present area of distribution. In either case no price cutting may be contemplated. However, the problem is still one that requires computation of the cost of additional production for comparison with the additional receipts expected from selling at the specified unit price.

On the other hand, price cutting is not at all uncommon and, provided those who manage the business wish to engage in it, the accountant should be able to show precisely and directly what the results will be. Unit costs that can be compared directly with selling prices are doubtless the best form of cost figure for the purpose. Thus in the example given previously, management can readily calculate the effect of any given selling price for Product B by merely keeping in mind the fact that at least 85 cents a unit is required to break even on this particular product and that any higher price results in a positive addition to total net profit. Roundabout calculations to determine the effect on total net profit via the reduction in underabsorbed overhead charges or the effect on cost of Product A are thus unnecessary.

Concentration on Less Profitable Product

The second objection listed above does not seem important where management has an adequate control over the operations of

its business. It is, of course, necessary to recognize that some products are capable of carrying more overhead than other products and that sales of products whose price returns little fixed overhead should not be allowed to grow at the expense of products that make a larger contribution.[9] The output of products able to carry little overhead must be limited to the quantity necessary to take up the slack in production capacity. Provided the different products are made in the proper proportions, the total net profit will be larger than if the company refuses to produce any article which cannot carry a full average share of fixed overhead cost. Finding the correct proportions in which to produce is a matter of analyzing costs and sales possibilities and it is at this point that the differential method of allocating costs becomes advantageous because it shows how much cost each product must carry; after this, keeping production correctly proportioned is a matter of skillful sales management. Given the latter, there is no reason why the situation should get out of hand.

Compilation of Costs

The preceding discussion has considered only the question of how cost should be computed for the purpose of deciding whether or not the addition of Product B should be undertaken. A second problem which arises is that of how the cost of Product B should be compiled in the accounts after its manufacture has begun.

Again the weight of accounting authority seems to favor charging Product B with overhead on the same basis already established for Product A. The theory upon which this practice is based is that Product B benefits from the previously existing production facilities and that it is equitable that it bear a part of the cost of these facilities. While logical, a different approach may produce information of greater value to management.

Once it has been decided to undertake the manufacture of Product B, management will then wish to compare the actual costs of

[9] Thus, for example, a shoe manufacturer brought out new brands to sell at low prices in order to counteract a dwindling sales volume. The purpose of the new brands was not explained to the salesmen, and finding the new brands easy to sell, the salesmen pushed the new lines rather than the old. As a result, the company's main business shifted to goods too low to yield a profit when sold alone.

manufacturing and selling the product with those costs anticipated. In fact, management may go so far as to set up standards against which to compare the actual costs in order to keep the latter under control and insure realization of the expected profits. Hence it would seem most convenient to collect actual costs according to the same plan that was used in computing the data upon which the initial decision was made—that is, to compare additional actual costs with the additional costs which were expected. This can readily be accomplished by charging Product B with only its direct costs plus the additional overhead that its production requires. However, two different overhead rates will be necessary, one for Product A and one for Product B.[10] This method has also an advantage in that it permits ready calculation of the effect that changes in price of cost elements or selling price of the product will have upon the profit margin realized from this product. Thus, for example, management can readily determine that it is still profitable to produce Product B when it can be sold at any price in excess of 85 cents per unit, whereas under customary accounting methods selling at a price under $1.60 per unit results in an apparent loss which must then be balanced against the gains from increased absorption of overhead.

Summary

In determining whether or not to add a new product to a company's present line the cost of making and selling the new product must be compared with the selling price in order to determine the profitability of the proposed addition. The decision may be based upon a comparison of anticipated total net profit figures under each alternative policy, or it may be made by comparing the unit cost of the new product with its unit selling price. Hence it is essential that both methods should yield the same result. Furthermore, the calculations should be as simple and the results reached as directly as possible.

[10] While it might be suggested here that the old normal overhead rate should be revised to reflect the greater output now expected, this action would still distribute to Product B part of the previously existing fixed charges. The cost of Product A would also be changed, although it may be asked why this change should occur when methods of making Product A are not altered in any way. No portion of the costs which cannot be avoided by deciding not to produce B should be allocated to the new product.

The ordinary accounting method yields correct total net profit figures, but the usual method of computing unit costs provides a figure which may lead management to adopt exactly the opposite course from that which will yield the largest net profit. Unit net profit can be made to harmonize with total net profit by distributing under- or over-absorbed overhead balances to product, but the same result can be had more easily by allocating to the new product only those costs which will be added by expansion of the present product line. While this method of cost computation can, if desired, be utilized only for deciding what policies to adopt, there seems to be merit in the proposal also to charge the new product only with differential cost in the accounts if manufacture of the product is actually undertaken. However, the foregoing discussion has considered only the problem of costing additional production under circumstances where unused capacity is already available. It is not intended that the conclusions here drawn should be applied generally to other situations, for they may well not be applicable.